Maastrichtian paleotemperature changes in the Southern Russia

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Water temperature change of even a few degrees can have irreversible consequences for the environment. We have studied several sections in the south of the Russian Platform, in the Crimea and the Caucasus. Sections of the Crimea, the Caucasus and the Saratov-Volga region in Maastricht, located near one paleolatitude. At this time, this area was a shallow-marine epicontinental basin north-eastern shelf zone of the Tethys Ocean. In this area, sediments of various types of sedimentation: carbonate and carbonate-clayey-clastic. To analyze the variation paleotemperatures values analyzed isotopic composition of carbon and oxygen carbonates, as well as the concentrations of elements and their relationships V, Ca, Ni, Mn, Ca/Sr, Ca/Mg, Sr/Ba, Si/Al, Zn/Nb, (Ce, Nd, La, Ba)/Yb, (Y, Zr), titanium module (TM) (BADULINA et al., 2016). The coefficient of variation δ¹⁸O/δ¹⁶O measured by a mass-spectrometer with an accuracy of ± 0.01 %. Paleotemperatures determined with an accuracy of up to 1°C rarely up to 0.5°C. Information about the surrounding environment indicator organisms (paleoecological analysis) helped to clarify the results and build a synthetic curve of temperature change on a range of techniques. For the Caucasus (Daria river section) paleotemperatures were quite high (from 19.33° to 34.59°C). According to earlier estimates, the climate in the Maastrichtian was warm enough, is characterized by high temperature of the sea basin, an average of about 14°C with strong warming in the range of 65.55–65.20 million years. Temperature data from the Crimea (Ak-Kaya section) to Maastrichtian range from 16.5° C to 21.7° C, whereas the Danian temperatures were higher: 26.4°C and 29.9° C. The increase of δ¹³C indicates an increase in the role of organic matter in the basin as well as living organisms use for photosynthesis δ¹²C and δ¹³C remains in the water and carbonates. Distribution of oxygen isotopes in the Ak-Kaya section shows that δ¹⁸O content decreases with increasing temperature. In determining the conditions of sedimentation section of the Saratov-Volga region (Lower Bannovka section) ratio of the chemical elements and their modules are allowed to detail the situation of sedimentation. By isotope data were calculated according to the formulas paleotemperatures, which were quite high (from 19.33° to 26.14° C). On the formation of this section deposits influenced Priural strait connecting Tethys and Paleoarctic. Through the strait of deep cold waters, rich of SiO₂, penetrated into the territory of the Saratov-Volga region, so the rock bottom of the section, represented by clays, noted the presence of the mineral opal (BLINOVA et al., 2015).

Thus, in all studied sections marked local temperature rise in the Late Maastrichtian, which is well correlated with the warm Late Maastrichtian transgression. This confirms the connection of the studied paleobasins in that time.

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